

How Archimedes took on the Romans

Ancient Greek thinker Archimedes is renowned for being an eccentric with his head stuck in the clouds, but he was so much more. His ingenious inventions helped wage warfare on the Roman empire, says Dr Michael Scott...

Monday 14th November 2016

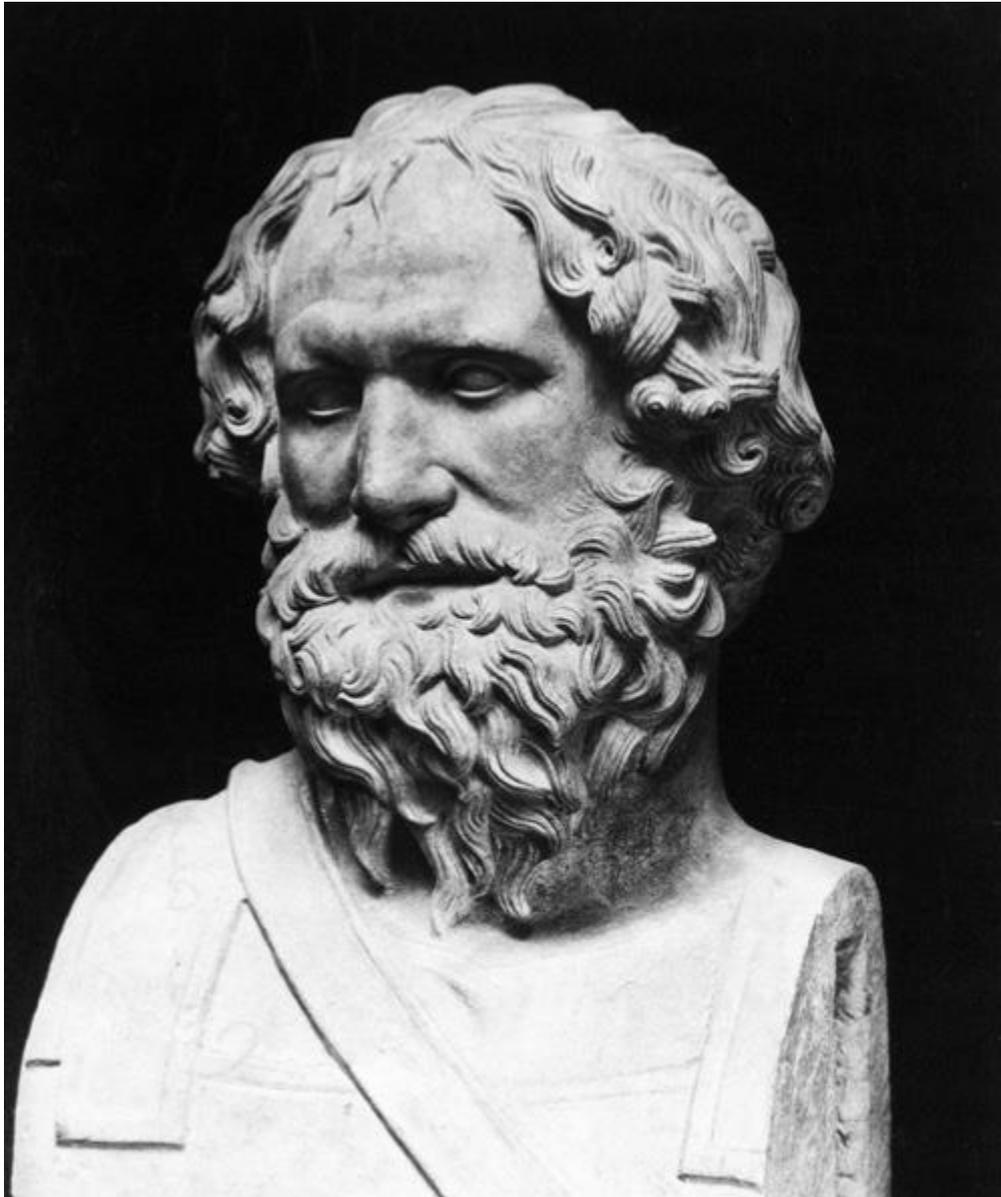


An engraving of Archimedes. (Getty Images)

Think of Archimedes (c287–212/211 BC), and I bet the image you have is that of a man jumping naked out of his bath, running down the street shouting “Eureka!” (ancient Greek for “I have found it”). That’s certainly the way he is depicted in the *Horrible Histories’ Groovy Greeks* book.

It is for this bizarre episode that Archimedes is probably most famous. He was given a task to find out whether a crown had been made with solid gold, or whether the maker had deceitfully substituted some of the gold for silver, keeping the rest for himself. In essence, Archimedes had to work out the density of the crown, but without damaging it. Given that it was irregularly shaped, he first had to come up with a novel way of calculating its volume. He did this by measuring how much water was displaced when the crown was submerged – an idea that supposedly came to him when he got into his bath and saw water being displaced by his own body. This gave him the crown’s volume, which he then used to divide its mass and find its density.

But Archimedes was so much more than an eccentric genius. He was also a brilliant mathematician, physicist, engineer, inventor and astronomer. Hailing from the city of Syracuse on the south east coast of Sicily, Archimedes was witness to the great change in power across the Mediterranean as the Romans rose to prominence. Indeed, it is for his role in taking on the Romans that I think Archimedes should be given more credit.



Bust of Archimedes. (Getty Images)

In 213–212 BC, the forces of Rome laid siege to Archimedes' city of Syracuse. The politics were complicated, but essentially the ruler of Syracuse had been caught betting the wrong way – he had sided with the Carthaginian general Hannibal against the Romans. At that time, Hannibal was wreaking havoc through Italy with his forces, after having crossed the Alps with the help of elephants. Rome decided to make an example of those who sided with Hannibal and sailed with its fleet to blockade Syracuse.

Syracuse held out against the Roman siege for months. And by no small amount this was due to Archimedes. By then in his seventies, Archimedes' significant brainpower was called on to help the Syracusans defend their city. And he did it brilliantly, proving he was no theoretical mathematician with his head in the clouds. Quite the opposite – he applied his incredible knowledge and understanding to real problems.

Archimedes improved the design of the city's catapults, enabling them to target the Romans further away and with better accuracy. He also created smaller catapults so that the Syracusans could still target the Romans when their ships were close to the city walls. He also invented crane-like machines that could be extended way out over the top of the city's walls, and swung around in an arc. Whenever a Roman ship approached, one of these cranes would be positioned over the top of it, and a pulley used to release massive stones or lead from its front end, which would come crashing down, destroying the ship and everything it was carrying (particularly its siege towers).



An 18th-century depiction of Archimedes' devices in use during the siege of Syracuse. (Getty Images)

Archimedes even had a Mark II design of this crane, known as the claw. This device not only had stones to rain down on an enemy ship, but also a metal claw which could be dropped with a pulley system, crashing into the ship's wooden decking. The pulley system could then be used to hoist the claw – with the ship now attached to it – up out of the water. The results were catastrophic for everyone aboard: the ship was either broken into pieces, with everything thrown off it, or it was capsized.

These triumphant inventions broke the Romans' courage and arguably prevented them from attempting an all out assault on Syracuse. The cost was just too great. As the Roman commander Marcellus wryly remarked, "Archimedes uses my ships to ladle sea water into his wine cups".

Polybius, the great historian who recorded Rome's rise to power, commented in his *Histories*:

"Such a great and marvellous thing does the genius of one man show itself to be when properly applied to certain matters. The Romans at least, strong as they were both by sea and land, had every hope of capturing the town at once if one old man of Syracuse were removed; but as long as he was present, they did not venture even to attempt to attack in that fashion in which the ability of Archimedes could be used in the defence."

The Romans did eventually take Syracuse – by exploiting a weakness in one of the land-facing defensive walls while the Syracusans were busy celebrating a religious festival. What became of Archimedes? It is said that Marcellus ordered his soldiers to take the inventor alive, but when a Roman soldier stumbled upon Archimedes he was working on some mathematical problem and refused to get up immediately, instead insisting on finishing his work. This angered the Roman soldier, who killed him. Marcellus is said to have been devastated – paying homage to Archimedes' family.



The death of Archimedes. (Getty Images)

Centuries later, the great Roman orator Cicero claimed to have found the tomb of Archimedes while in Syracuse – lost among overgrown vegetation. He chastised the Syracusans for not paying greater honour to one of their most illustrious citizens. We cannot establish whether Cicero really found such a tomb, and today we once again have no idea where Archimedes is buried. That for me is a real sadness. Not simply the loss of his final resting place, but the absence in Syracuse today of any real memorial (bar one bust and one rather odd statue) to this great inventor, genius and civic defender. For my money, Archimedes deserves better!

Michael Scott is an author, broadcaster and associate professor of classics and ancient history at the University of Warwick. He will be presenting a two-part series on the history of Sicily on BBC Two in early 2017. You can find out more about Michael's upcoming projects at www.michaelscottweb.com, or follow him on twitter [@drmichaelscott](https://twitter.com/drmichaelscott).

- Article Type: | [BBC History Magazine](#) | [Ancient Greece](#) | [International history](#) | [Maritime](#) | [Romans](#) | [Military history](#) | [People in history](#) | [Weird and wonderful](#) | [Feature](#) | [Romans Week](#) |